China in Three Acts: Science

By Suzi Huff Theodoro. Source: EcoDebate

2025/07/30

We present an excerpt from the article 'China in Three Acts' written by Suzi Huff Theodoro, professor in the Postgraduate Programme in Environment and Rural Development at the University of Brasilia (UnB). The professor was part of the presidential delegation that visited China last May, and she decided to share her memories of this trip in three acts: 'tourism, which captivates the eye and the soul; science, which challenges the mind and provides certainty; and politics, which shapes destinies and transforms geopolitics.'

On this occasion, we share the section on Science, where Suzi recounts her academic mission within the framework of cooperation between UnB and the Research Institute for Organic Recycling at the China Agricultural University (CAU).

Act 2 – Sciences

The main reason for my trip to China was to present the results of research on rock, a topic we have been developing in Brazil for almost 30 years, and to which I have dedicated all my energies. The exciting thing is that, since the mid-2010s, Brazil has become a leader in the use of ground rocks for agricultural purposes. We have scientific results, regulations, and several successful examples of the use of soil remineralizers, the name given to rock powders that have already obtained official registration. Events, presentations, and discussions were scheduled on this topic and how it could be linked to accelerated composting technology, developed by a team of scientists from the China Agricultural University (CAU).

About two years ago, the University of Brasília (UnB) signed a cooperation agreement with the CAU, which resulted in the creation of the Brazil-China Center. This agreement has three main pillars: the import and development of agricultural machinery for family farming, and research and extension involving students from UnB and CAU, as well as family farmers, particularly from the Landless Workers' Movement (MST). The third pillar is the development of an accelerated composting project, which will initially utilize technology developed in China and facilitate the transformation of organic waste and tree prunings into high-quality agricultural inputs in just a few days.

The process involves a treatment system that utilizes a closed silo reactor, where waste undergoes high-temperature aerobic fermentation. The process is accelerated by the addition of microorganisms, and this aerobic fermentation method takes place within 7 to 12 days. A similar system is planned for the Darcy Ribeiro Campus of UnB, where the waste produced by the university cafeteria will be converted into agricultural input. Some of the branches and trunks obtained from tree pruning on the campus will also be used in the process.

The UnB project team aims to combine the benefits of accelerated composting with the principles of rock-milling technology. By adding remineralizers to the composting process, the compost is enriched with mineral nutrients from the ground rocks. During the process, high temperatures can destabilize some mineral phases, facilitating the weathering process when the product is added to the soil's environmental conditions. Furthermore, the material will arrive in the soil already enriched with a series of microorganisms that will facilitate the bioweathering of the minerals contained in the final product or even those originally present in the soil. Currently, as a postdoctoral fellow, Professor Caroline Gomide of UnB is conducting initial tests at the Organic Recycling Research Institute of the CAU in Suzhou, and it was to contribute to the process that she traveled to China.

A busy schedule awaited me, but my curiosity was immense. Initially, I attended meetings with agricultural machinery manufacturers, who envisioned significant business potential in Brazil, given the utter lack of adequate equipment for the work and management of family farms. It's important to note that agricultural establishments in China are quite small, a result of the unparalleled agrarian reform implemented by the Communist Party in the 1950s. More recently (the last 30 years), with the technological transformation implemented in that country, the government supported and encouraged innovations that would facilitate farmers' work and, at the same time, result in higher productivity per cultivated area. Chinese companies have developed previously unimaginable equipment that facilitates management on small farms.

Some of these machines have already been acquired by a consortium of states in Northeast Brazil and are being tested and adapted to the conditions of the region's diverse agroecosystems. UnB also received some machines, which are undergoing testing and adaptation at Fazenda Água Limpa. After this phase, the machines will be used in the University's extension courses and in agrarian reform settlements located in the Federal District and surrounding areas.

After being amazed by the various possibilities presented by machine manufacturers, it was my turn to present the assumptions and principles of rockfill to graduate students at CAU. Worried that my fluency in English would compromise my presentation, I soon realized that English would not be a problem, as it's neither the presenter's nor the audience's native language. I was warmly welcomed and noticed the great interest this topic generated among students and faculty. After the presentation, I was met by Professor Li Ji, the scientist who designed and developed the accelerated composting reactor. He recently received an award from the Chinese government for developing this technology. I have been welcomed by eminent professors in Europe, but I have never been so warmly welcomed as I was in China. After our conversation in his office, the professor insisted on accompanying us to the subway. Furthermore, he provided a fantastic service structure for the visit to the factory, farm, and laboratories of the Institute, which he co-directs and created to develop the technology and process waste produced in the city of Suzhou.

The plant has a relatively simple waste processing system, using chambers, conveyors, and reactors that execute the process automatically. It was possible to see the incoming material to be composted and the final product, collected in huge bags, distributed to farmers with land near the city and to the Institute's experimental farm. Most impressively, there is almost no odor characteristic of composting areas. This means that the gases generated in the process are separated and collected.

After the factory, we went to the Institute's experimental farm, where various agricultural trials are conducted. At that moment, one of the areas was receiving and

applying the compost to the soil. It was an area prepared for rice planting. Of course, I went to check the soil quality and how the material was incorporated. I was impressed by the aeration and biological diversity of the soil receiving this material. Throughout the visit to different plots, I was able to see how much research and science are valued and taken seriously. Several posters and banners showed the results of each of the agronomic trials conducted with different types of agricultural crops.

From the farm, we headed to the Institute's laboratories. Accustomed to laboratory spaces in Brazil, I was astonished by the research infrastructure: a 12-story building, composed of several rooms with the most modern analytical equipment I have ever seen—everything we researchers dream of having in our laboratories. Perhaps only Cenpes, Petrobras' Research Center, has this kind of research equipment. Many students conduct their research there. They also receive grants to dedicate themselves exclusively to developing and perfecting the composting process. Many of these students can, after completing their master's and doctoral degrees, continue working at the Institute if they so wish.

Beyond being stunned by the development process of a single technology, the visit to CAU was educational in my understanding of the necessary interaction between science and a country's demands. By supporting research, the government fosters the creation of new companies that emerge from universities. Once they find successful solutions to the problems they were created to solve, they disassociate themselves from the universities and become independent companies or business units (spin-offs). However, they remain connected to research, offering opportunities for students who wish to enter research. The investments that supported research and innovation are then directed toward other needs. By developing new patents and products, these students can also create new companies, always committed to finding solutions to the problems demanded by the government. It is a never-ending process that expands according to the country's needs and the scientists' curiosity.

Understanding this process allowed me to understand why China was able to make such a leap in technological development in just 30 years. Investment in research and innovation is at the heart of societal transformation. There is no problem that does not deserve a solution, and there is no solution that can not be transformed into a technological advancement available to all who demand it.

I believe that Brazil has immense potential to repeat this true crusade towards a much more developed, technological, and fair future.

Republished from EcoDebate. Original language: Portuguese. Translated into English by ROOTS. Available at: https://www.ecodebate.com.br/2025/07/18/a-china-em-tres-atos/